


Case Report

Development of strangulation ileus associated with the ureter of the transplanted kidney 18 years after kidney transplantation

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Abbreviations & Acronyms

CKD = chronic kidney disease

CT = computed tomography

KT = kidney transplantation

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Introduction: After kidney transplantation, patients should be treated with caution and monitored for surgical complications. Among the possible surgical complications, strangulation ileus after kidney transplantation is rare.

Case presentation: A 59-year-old woman who had undergone kidney transplantation at 41 years of age presented to our hospital with lower abdominal pain. She was diagnosed with strangulation ileus and underwent emergency surgery. In the lower right abdomen, the small intestine was compressed by cord-like tissue running from the intraperitoneal space to the retroperitoneal space. We confirmed that the cord-like tissue was the ureter of the transplanted kidney. The necrotic small intestine was resected, and ureter-ureteral anastomosis of the ureter of the transplanted kidney was performed.

Conclusion: All surgical procedures, including ureteroneocystostomy, require careful attention. The occurrence of some postoperative surgical complications can be prevented by carefully performing the kidney transplantation procedure.

Key words: kidney transplantation, strangulation ileus, surgical complication, ureteroneocystostomy.

Keynote message

Many complications can occur over time after kidney transplantation (KT). However, it may be possible to prevent the occurrence of complications after KT by paying attention to the surgical technique.

Introduction

In the treatment of CKD, patients who undergo KT have improved quality of life compared to patients on chronic dialysis.^{1,2} However, some medical complications can occur after KT, such as delayed graft function and acute graft dysfunction, as well as side effects from drugs.³

Regarding surgical complications, the establishment of surgical techniques has resulted in significant decreases in the incidence of surgical complications after KT.⁴ However, early diagnosis and appropriate intervention are important for minimizing the adverse effects of these complications on the grafts and kidney transplant patients.⁴

We present a rare case of strangulation ileus, which is one such surgical complication, that developed 18 years after living-donor KT.

Case presentation

A 59-year-old woman was admitted to our hospital for lower abdominal pain. She had undergone KT at 41 years of age with her father as the donor due to CKD caused by lupus nephritis after a 6-year dialysis period. At that time, the kidney was transplanted into the right iliac fossa within the retroperitoneum. The bladder capacity was 260 mL. A longitudinal incision was made in the bladder, and intraextravesical ureteroneocystostomy was performed on the

posterior wall of the bladder. The postoperative course was favorable; the maintenance immunosuppressive drugs were cyclosporine 40 mg, mycophenolate mofetil 500 mg, and methylprednisolone 2 mg, and her renal function was good.

There was no fever at the time of the visit, and lower abdominal tenderness was apparent, but no symptoms of peritonitis were present. Laboratory data showed only a slight increase in white blood cell count (10 100/ μ L) and slight exacerbation of the creatinine level from 1.0 mg/dL at the last visit to 1.4 mg/dL. Noncontrast-enhanced CT was performed because of a decrease in renal function, and mild dilation of the renal pelvis and a mild increase in the perirenal adipose tissue concentration were observed in the transplanted kidney. Acute pyelonephritis was diagnosed according to the CT and clinical findings even though urinalysis showed no pyuria, and the patient was hospitalized for immediate treatment. Antibiotics for pyelonephritis and analgesics for abdominal pain were started. However, her abdominal pain worsened, and abdominal distension was observed. Noncontrast-enhanced CT and plain abdominal X-ray radiography were performed and revealed obvious findings of ileus (Fig. 1). A diagnosis of strangulation ileus was made, and emergency surgery was performed.

The abdomen was opened by a midline abdominal incision with the patient in the supine position. A segment of necrotic, black-colored small intestine was found in the lower right abdomen; the small intestine was constricted by cord-like tissue running from the bladder through the intraperitoneal space to the outside of the peritoneum (Fig. 2). The cord-like tissue was ligated and cut, and the small intestine was released. The necrotic small intestine was resected (Fig. 3), and the normal small intestine was anastomosed. We noted that the patient had not urinated since the surgery began. We untied the ligature of the cord-like tissue that was strangulating the small intestine, causing urine to be rushed. We noted that the cord-like tissue was the ureter of the transplanted kidney. A ureteral stent was inserted, and ureter-ureteral anastomosis of the affected ureter was performed. Moreover, the ureter of the transplanted kidney was completely relocated to the retroperitoneal space, and the peritoneum was closed.

The postoperative course was uneventful, and the patient was discharged 20 days after surgery. The creatinine level at discharge was 1.0 mg/dL. The maintenance immunosuppressive drugs were continued at the same doses as before admission, and the trough concentration of cyclosporine was 17 ng/mL.

Discussion

To the best of our knowledge, this is the first reported case of strangulation ileus as a surgical complication after KT.

Strangulation ileus is a critical condition necessitating emergency surgery; in these cases, early diagnosis and surgical decision making are required. Many strangulation ileus patients must undergo bowel resection due to severe anoxic injury.⁵ A previous study reported that arterial-phase contrast-enhanced CT is useful for the early diagnosis of strangulation ileus.⁶ However, in this case, contrast-enhanced CT could not be performed due to the deterioration of renal function, and noncontrast-enhanced CT was performed instead. As a result,

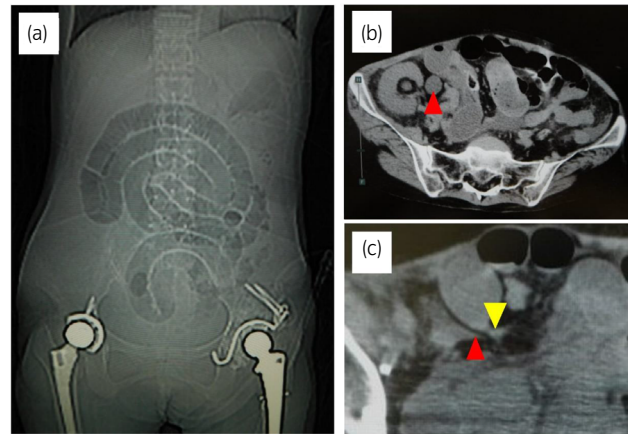


Fig. 1 (a) Plain abdominal X-ray showing the status of the ileus with the patient in the supine position. (b) Noncontrast-enhanced CT showing ureteral dilatation (red arrowhead) of the transplanted kidney. (c) Noncontrast CT showing the strangulation site of the small intestine (yellow arrowhead) and the ureter pointing toward the strangulation site (red arrowhead).

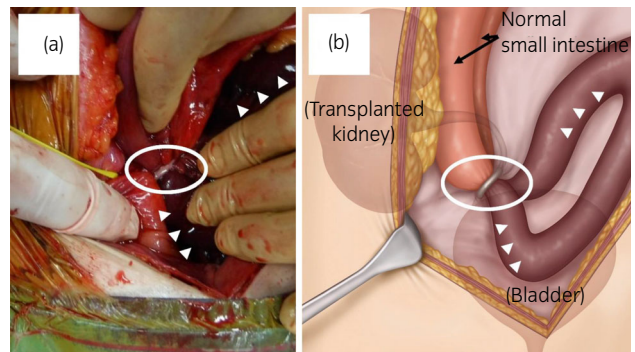


Fig. 2 (a) Strangulation of the small intestine by the distal ureter (white circle) of the transplanted kidney with blackened necrotic small intestine (white arrowheads). (b) Illustration of the photo in (a).

the diagnosis may have been delayed. Because of renal function considerations, it is difficult to perform contrast-enhanced CT after KT, and it is necessary to repeat comprehensive examinations according to the patient's symptoms to obtain an early diagnosis.

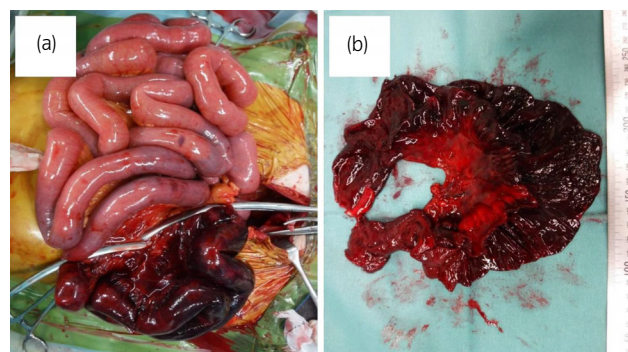


Fig. 3 (a) Blackened necrotic small intestine due to strangulation ileus before transection. (b) Blackened necrotic small intestine due to strangulation ileus after transection. The resected small intestine was approximately 70 cm in length.

Ureteroneocystostomy is an important procedure in KT that can affect the incidence of urinary complications.⁷ In kidney transplant surgery, the surgical procedure of vesicoureteral reflux is often applied to ureteroneocystostomy. The technique is roughly classified into extravascular method, intravesical method, and intraextravesical method. Regarding the possible complications, a previous study reported that extravascular ureteroneocystostomy was associated with significantly fewer urinary tract infections and might be preferable because of its surgical simplicity.⁸ In this case, according to the operative record, ureteroneocystostomy was performed using the intraextravesical technique at the posterior wall of the bladder. The complication may have occurred because the position of the peritoneum was not sufficiently confirmed during ureteroneocystostomy. Additionally, it cannot be ruled out that the distal ureter moved into the intraperitoneal space because the peritoneum was unknowingly damaged, for example, when the peritoneum around the bladder was peeled off.

The method of ureteral reconstruction is controversial. If the transplanted ureter is cut, blood flow in the lower part of the ureter will be impaired. Therefore, it may be better to anastomose the transplanted ureter with the patient's ureter. The cause of strangulated ileus was a cord-like tissue, which turned out to be the transplanted ureter. However, it was curiously not accompanied by surrounding tissue, including feeding vessels. We performed ureter-ureteral anastomosis as we recognized that only the transplanted ureter was cut. However, if the feeding vessels of the transplanted ureter were also unknowingly cut during surgery, the transplanted ureter could have been anastomosed to the patient's ureter.

Each surgical procedure during KT should be performed carefully. Contrast-enhanced examinations after KT may be difficult to perform depending on renal function, but performing comprehensive examinations repeatedly according to the patient's symptoms can help diagnose strangulation ileus as early as possible.

Acknowledgments

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Conflict of interest

The authors declare no conflict of interest.

Approval of the research protocol by an Institutional Review Board

All procedures performed in studies involving human participants were performed in accordance with the ethical standards of the institutional research committee at the institution where the studies were conducted (Institutional Review Board approval no. A19-097) and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Registry and the Registration No. of the study/trial

None.

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